FT-5000

AM/FM STEREO TUNER

INSTRUCTION MANUAL

Congratulations!
HITACHI Hi-Fi products are the result of HITACHI engineering research and development and we are proud to claim that we have had over 50 years of experience in electronics. Laboratories and major testing facilities are maintained in Tokyo and Toyokawa, Japan.
In choosing this fine HITACH Hi-Fi product you have demonstrated an acute awareness of "getting the most for your money". With HITACH products this is not an idle boast.

KEY TO ILLUSTRATIONS

① POWER switch
② SCAN/FM MUTE switch
③ TUNING keys
④ MEMORY write key
⑤ PRESET keys
⑥ MODE switch
⑦ FUNCTION switch
⑧ Station indicators
⑨ MEMORY write indicator
⑩ Frequency display
⑪ FM STEREO indicator
⑫ SIGNAL indicators
⑬ FM ANTENNA terminal (75 ohms) (DIN) (for Europe, Asia and Latin America)
⑭ FM ANTENNA terminals (300 ohms)
⑮ Coaxial cable terminal (75 ohms) (for U.S.A. and Canada)
⑯ AM ANTENNA terminal
⑰ Ground terminal (GND)
⑱ OUTPUT terminals
⑲ BATTERY BOX
⑳ Power supply cord
㉑ AC outlet (for U.S.A., Canada, W. Germany, Asia and Latin America)
㉒ VOLTAGE SELECTOR (for W.Germany, Asia and Latin America)
㉓ AM ferrite antenna

SAFEGUARD
Electrical energy can perform many useful functions. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in electic shock or fire hazards. In order not to defeat the safeguards, observe the following instructions for its installation, use and servicing.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

INSTALLATION

When installing the FT-5000 choose a place that satisfies the following conditions:
1. Install it in a place out of direct sunlight and away from stoves, etc.
2. Install it in a place where ventilation is good and which is free from moisture and dust.
3. Install on a stable and vibration-free surface.

NOTICE: Before using this set, be sure to install the three accessory batteries in the BATTERY BOX ⑲ at the rear and align their polarities correctly.
These batteries are used for memory back-up and it is recommended that they are replaced with fresh ones within two years. **Use HITACHI UM-3(G) 1.5 V dry batteries Size "AA" (R6) or their equivalent.**

IMPORTANT FOR U.K.:
WARNING: This apparatus must be earthed. The wires in this mains lead are coloured in accordance with the following code:

Green and Yellow	: EARTH
Blue	: NEUTRAL
Brown	: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows. The wire which is coloured GREEN and YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN and YELLOW.
The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.
The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

FEATURES

1. The AM/FM tuning circuits adopt a digital synthesizer system which is based on a crystal oscillator and a PLL (Phase-Locked Loop) IC in order to keep the deviations in the local oscillation frequency down to the accuracy of the crystal oscillator. The adoption of a microcomputer for the tuning control permits automatic tuning from 88.1 *(87.50) MHz to 107.9 *(108.00) MHz in 200* (50) kHz steps for FM reception and manual tuning from 530 *(531) kHz to 1610 *(1602) kHz for AM reception. It also permits the preset tuning of up to seven AM or FM stations. It serves to provide more accurate tuning and enhance operating ease—ideal features now that the number of broadcasting stations is on the rise.
...Frequency range: U.S.A. and Canada (Europe, Asia and Latin America)

	FM section		AM section	
	Frequency range	Step frequency	Frequency range	Step frequency
U.S.A., Canada	88.1 – 107.9 MHz	200 kHz	530 – 1610 kHz	10 kHz
Europe, Asia and Latin America	87.5 – 108.0 MHz	50 kHz	531 – 1602 kHz	9 kHz

2. In place of the usual signal meter, there are signal indicators made up of five light-emitting diodes (LEDs) which display the signal strength. This is a feature you would expect to find in a digital synthesizer tuner, and it tells you the strength of the FM and AM signals at a glance.
3. A dual gate MOS FET is used in the 4-gang electronic tuner and in the RF stage an FET circuit having superb automatic gain control (AGC) characteristics features effective interference rejection.
4. The FM MPX section incorporates a phase-locked loop (PLL) IC to assure stable FM stereo reception and sharp channel separation.
5. A muting circuit employing a reed relay is used for the muting circuit and this is designed to suppress interstation noise which is generated during the tuning operation. It keeps irritating popping noises down to the bare minimum.
6. The programmed stations can be recalled at any time by depressing the corresponding PRESET key, and station indicators above the keys identify which key has been selected.
7. FT-5000 has a convenient DC memory back-up system. This operates on three UM-3 (AA) or R6 dry cells for up to two years, so that in the event of a power failure the memory is not erased.
8. Other attractions include coaxial cable connectors (for U.S.A. and Canada) and a DIN antenna socket (Europe, Asia and Latin America). They all make the tuner easier to operate.

CONTROLS AND SWITCHES

① POWER switch

When this switch is set to ON (⊏), power is supplied to the tuner and the frequency display comes on.

② SCAN/FM MUTE switch AUTO/MANUAL SCAN

- **Released**
  (FM auto tuning, FM Mute ON)
  (⊐) . . . . . When this switch is set to the released position, the TUNING keys ③ function in the AUTO SWEEP mode. See TUNING keys ③, AUTOMATIC SWEEP UP and SWEEP DOWN. (FM only) This is the usual position. The interstation noise generated when tuning between stations will be suppressed.
- **Depressed**
  (Manual tuning, FM Mute OFF)
  (⊏) . . . . . In this position, the TUNING keys ③ function in the MANUAL mode. See TUNING keys ③, MANUAL UP and DOWN. When this switch is kept at the released position (⊐), very weak signals are sometimes cut out and the broadcast cannot be received. In cases like this, depress this switch (⊏) and you will then be able to listen to weak signal stations.

AM position (FUNCTION switch)

The tuner is set to the manual mode regardless of the position of the SCAN/FM MUTE switch. See TUNING keys ③, MANUAL UP and DOWN.

③ TUNING keys

1. Automatic Tuning (FM only)

Set the SCAN/FM MUTE switch ② to the released (⊐) position.

SWEEP UP . . . When this key is depressed, the reception frequencies are swept continuously up the scale until the frequency of a station actually broadcasting is reached. The sweeping then stops automatically. The changes in the frequencies are as follows:

For U.S.A. and Canada
88.1 88.3 88.5 . . . . . 107.5 107.7 107.9 88.1 88.3 . . . . . .

For Europe, Asia and Latin America
87.50 87.55 87.60 . . . . . 107.90 107.95 108.00 87.50 87.55 . . . . . .

SWEEP DOWN . . . . . When this key is depressed, the reception frequencies are swept continuously down the scale until the frequency of a station actually broadcasting is reached. The sweeping then stops automatically. The changes in the frequencies are as follows:

For U.S.A. and Canada
107.9 107.7 107.5 . . . . . 88.3 88.1 107.9 107.7 . . . . . .

For Europe, Asia and Latin America
108.00 107.95 107.90 . . . . . 87.60 87.55 87.50 108.00 107.95 . . . . .

2. Manual Tuning

Set the SCAN/FM MUTE switch ② to the depressed position (⊏).

UP . . . . . Each time this key is depressed, the reception frequency is raised in 200 (50) kHz steps for FM and 10 (9) kHz steps for AM. If the key is depressed for more than a second, the frequency will change continuously in 200 (50) kHz steps for FM and 10 (9) kHz steps for AM. It will stop when you remove your finger. The changes in the frequencies are as follows:

FM...U.S.A. and Canada
88.1 88.3 88.5 . . . . . 107.5 107.7 107.9 88.1 88.3 . . . . .

Europe, Asia and Latin America
87.50 87.55 87.60 . . . . . 107.90 107.95 108.00 87.50 87.55 . . . . . .

AM...U.S.A. and Canada
530 540 550 . . . . . 1590 1600 1610 530 540 . . . . .

Europe, Asia and Latin America
531 540 549 . . . . . 1584 1593 1602 531 540 . . . . . .

DOWN . . When this key is depressed, as with the UP key, the reception frequency is lowered in 200 (50) kHz steps for FM and 10 (9) kHz steps for AM. The changes in the frequencies are as follows:

FM...U.S.A. and Canada
107.9 107.7 107.5 . . . . . 88.5 88.3 88.1 107.9 107.7 . . . .

Europe, Asia and Latin America
108.00 107.95 107.90 . . . . . 87.60 87.55 87.50 108.00 107.95 . . . . .

AM...U.S.A. and Canada
1610 1600 1590 . . . . 550 540 530 1610 1600 . . . . .

Europe, Asia and Latin America
1602 1593 1584 . . . . . 549 540 531 1602 1593 . . . . .

CAUTION:
The sweeping operations may not stop automatically with automatic tuning even when weak signal strength stations are being received. In cases like this, set the SCAN/FM MUTE switch ② to the depressed position (⊏) and tune in the desired station with the manual tuning.

④MEMORY write key

This is used when one of the PRESET keys ⑤ is used to memorize broadcasting stations. When the MEMORY write key is depressed, the MEMORY write indicator ⑨ lights up for about 5 seconds to indicate that the microcomputer has been set to the memory write mode (state in which stations can be memorized). If any of the PRESET keys ⑤ is depressed while the MEMORY write indicator ⑨ is on, the FM or AM station which is displayed on the frequency display ⑩ will be memorized and at the same time the station indicator ⑧ lights and the Memory write indicator ⑨ will go off. After this indicator has been on for about 5 seconds, it will go off and the station will cease to be memorized. In other words, if this indicator goes off before you memorize the station, you will have to depress the MEMORY write key again.

⑤PRESET keys

There are seven preset keys and they can all be used together with the MEMORY write key ④ to memorize up to seven AM or FM broadcasting stations. Once the stations have been memorized, you need only depress the corresponding key and the tuner will be tuned into the station.

If a key which does not store a broadcasting station frequency is depressed, the station whose signals were being received immediately before is then heard.

⑥MODE switch

- **Released**
  (⊓) . . . . . This is the usual position. The FM stereo signals from the broadcasting station will be reproduced.
- **Depressed**
  (⊔) . . . . . An irritating noise can be heard due to stereo reception even when the broadcasts are picked up. In cases like this, depress this switch (⊔). You will then be able to listen to the broadcasts in mono and the level of the noise will be reduced.

⑦FUNCTION switch

- **Released**
  (⊓) . . . . . Use this position for receiving FM broadcasts.
- **Depressed**
  (⊔) . . . . . Use this position for receiving AM broadcasts.

⑧Station indicators

When a PRESET key ⑤ is depressed, the corresponding station indicator ⑧ lights. This indicator shows which station has been depressed.

Note:
The indicator does not light if a broadcasting station has not been stored.

⑨MEMORY write indicator

This indicator comes on for about 5 seconds when the MEMORY write key ④ is depressed. It will go off when one of the PRESET keys ⑤ is depressed while this indicator is on and the desired broadcasting station is memorized.

⑩Frequency display

When the POWER switch ① is set to ON (⊔) the frequency will be displayed.

⑪FM STEREO indicator

This indicator comes on when an FM stereo broadcast is being received. It does not come on, however, when the MODE switch ⑥ is set to the depressed position (⊔), and the broadcast is received in mono even if it is transmitted in stereo.

⑫SIGNAL indicators

These come on when a broadcast is received. The more indicators come on, the greater the signal strength.

BATTERIES

BEFORE USING YOUR MODEL, LOAD THREE BATTERIES INTO THE BATTERY BOX ⑲ TAKING CARE TO ALIGN THE POLARITIES CORRECTLY.

To remove the BATTERY BOX cover, first loosen the screw, slide it upward, then remove the bottom edge, and pull.

Load the three batteries into the BATTERY BOX ⑲, taking care to align the polarity marks on the batteries with the marks inside the box.

USE HITACHI UM-3 (G) 1.5 V DRY BATTERIES SIZE "AA" (R6) OR THEIR EQUIVALENT.

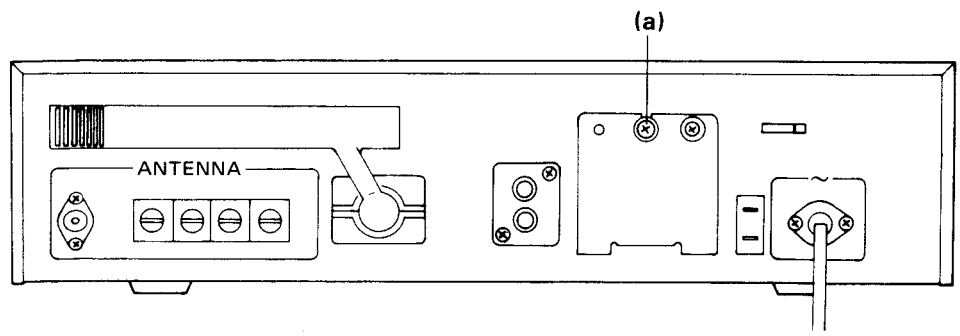
This model uses three batteries for memory back-up, and although only weak current flows, the terminal voltage will drop, due to self-discharge of the batteries. The batteries will last one or two years according to conditions and this set is designed to hold the contents of the memory about an hour without batteries. Deterioration in the performance of the batteries may, therefore, not be noticed. Make sure that they are replaced with new ones within two years.

IF THEY ARE KEPT LONGER, THEY MAY LEAK AND DAMAGE THE MODEL.

a. Do not recharge the batteries.
b. Make sure that the polarities are aligned correctly (⊕to⊕, ⊖to⊖).
c. Do not short the plus ⊕ and minus ⊖ terminals with a cable or piece of metal.
d. Do not throw the batteries into a fire to dispose of them.
e. Do not try to disassemble the batteries.
f. Remove the batteries as quickly as possible from the set when they are spent, and throw them away.
g. Do not use different kinds of batteries together. Do not mix manganese batteries with alkaline manganese batteries or silver oxide batteries, for instance.
h. Do not mix spent batteries with new batteries.

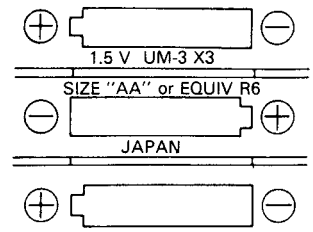
OPERATIONS

(A) How to install the batteries



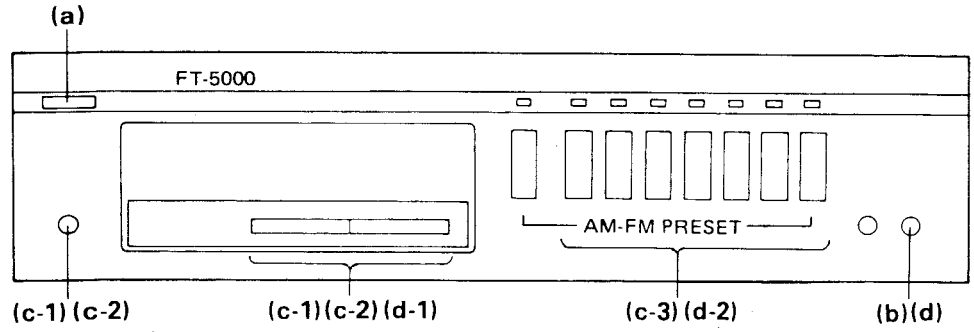
(a) Open the BATTERY BOX ⑲.
  (1) Loosen the screw with a screwdriver.
  (2) Slide the cover upward and remove the bottom edge first.
  (3) Then pull off the battery plate and remove it.

(b) Install three batteries. Align their polarities correctly.



(c) Mount and secure the battery plate with screw.

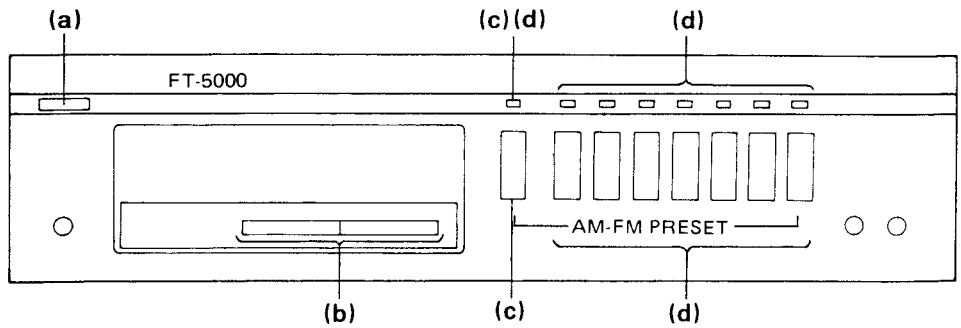
(B) How to receive an FM, AM broadcast



(a) Set the POWER switch ① to the ON position (▭).
(b) Set the FUNCTION switch ⑦ to the released position (□).
(This is the FM position.)
(c) Tune in the station by any of the following positions:
(1) Set the SCAN/FM MUTE switch ② to the released position (□).
Depress the TUNING key ③. In this case these keys function in the automatic sweep up or automatic sweep down mode.
(2) Set the SCAN/FM MUTE switch ② to the depressed position (▭).
In this case these switches function in the manual tuning mode. The tuning point is indicated by the largest number of SIGNAL indicators ⑫ which have come on. The FM STEREO indicator ⑪ comes on with a stereo broadcast.
(3) Depress the PRESET keys ⑤. (Refer to the next page for memorizing broadcasting stations with the PRESET keys ⑤.)
(d) Set the FUNCTION switch ⑦ to the depressed position (▭). (This is the AM position.)
(1) In AM reception these switches function in the manual tuning mode, regardless of the position of SCAN/FM MUTE switch ②. The tuning point is indicated by the largest number of SIGNAL indicators ⑫ which have come on.
(2) Depress the PRESET keys ⑤. (Refer to the next page for memorizing broadcasting stations with the PRESET keys ⑤.)

CAUTION:
When the SCAN/FM MUTE switch ② is set to the released position (□), it may not be possible to automatically tune in weak signal stations. In cases like this, set the SCAN/FM MUTE switch ② to the depressed position (▭), and tune the station manually.

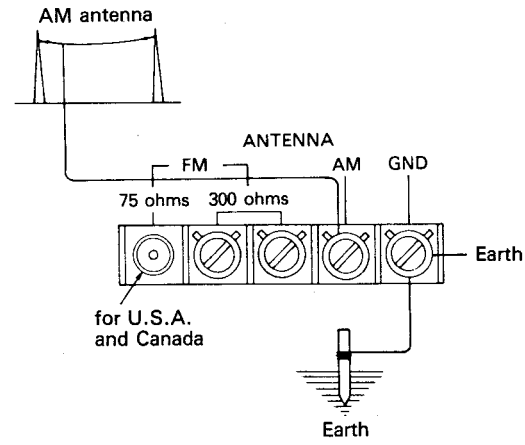
(C) How to memorize broadcasting stations with the PRESET keys



(a) Set the POWER switch ① to ON (▭).
(b) Tune in the station you want to be memorized using the TUNING keys ③.
(c) Depress the MEMORY write key ④. The MEMORY write indicator ⑨ comes on for about 5 seconds.
(d) If the key corresponding to the station to be memorized between 1 and 7 is depressed, the MEMORY write indicator ⑨ goes off and the corresponding station indicator ⑧ lights up to indicate that the station has been memorized. It will not be memorized unless the PRESET key ⑤ is depressed while the MEMORY write indicator ⑨ has come on (about 5 seconds).

Ferrite Bar Antenna
When this set is used in a location near a broadcasting station, the ferrite bar antenna will give optimum reception.

Outdoor AM Antenna
When using this set far from the broadcasting station or at a place where the radio reception is adversely affected by ferroconcrete buildings or some other structure, install an outdoor antenna. Connect vinyl wire to the AM ANTENNA terminal ⑯ on the rear of this set, and install the antenna a short distance from the building. Fix the antenna where the best radio reception can be obtained.



WHAT TO DO IF ?

There can be a variety of problems due to the mishandling of the TUNER.
When a problem occurs, please check the table below which describes possible problems occurring with your TUNER. Since the TUNER is completely checked and adjusted before shipping, there are no user serviceable and adjustable parts inside. But if the TUNER is not operating correctly and you are unable to restore normal operation by following the detailed procedure in the table below, do not remove the cover of the set or attempt any further adjustments. Unplug the set and contact your dealer or nearest HITACHI service station.

Symptom	Cause	Remedy
Frequency display and signal indicators come on but no sound.	• Tuner's output cords are not connected to amplifier or are connected improperly.	○ Check connections of output cords.
When the keys are touched, signal indicators go off and cannot receive a broadcast, or the frequency display goes on as above or memorized frequency with presetting operation changes.	• Malfunction in microcomputer due to static electricity.	○ Turn off the power switch ① and then wait at least 5 seconds before turning it on.
With automatic tuning, frequency display does not stop indicating and there is no sound.	• Antenna connection has worked free. • Input signals at antenna terminals are weak.	○ Connect the antenna properly to the antenna terminals. ○ Erect an outdoor FM antenna. If automatic tuning still cannot be performed, set the SCAN/FM MUTE switch to the depressed position and tune the station in manually.
Intermittent hissing noise is heard frequently.	• This is caused by the ignition of passing automobiles. The noise limiter circuit which is built into the tuner does not work in weak-signal areas at a distance from the transmitting antenna, and so the noise level is increased.	○ If you are using the accessory feeder antenna, change over to an outdoor FM antenna. When erecting your outdoor antenna, install it as far away from roads as possible so that the effects of extraneous noise are reduced.
A constant hissing noise is heard with the broadcast and this increases when the tuner is set to the stereo mode.	• Input signals at antenna terminals are weak.	○ Erect an outdoor FM antenna.

SPECIFICATIONS

Specifications and design may be changed without notice since the policy of this company is one of continuous improvement.

FM TUNER SECTION (DIN)

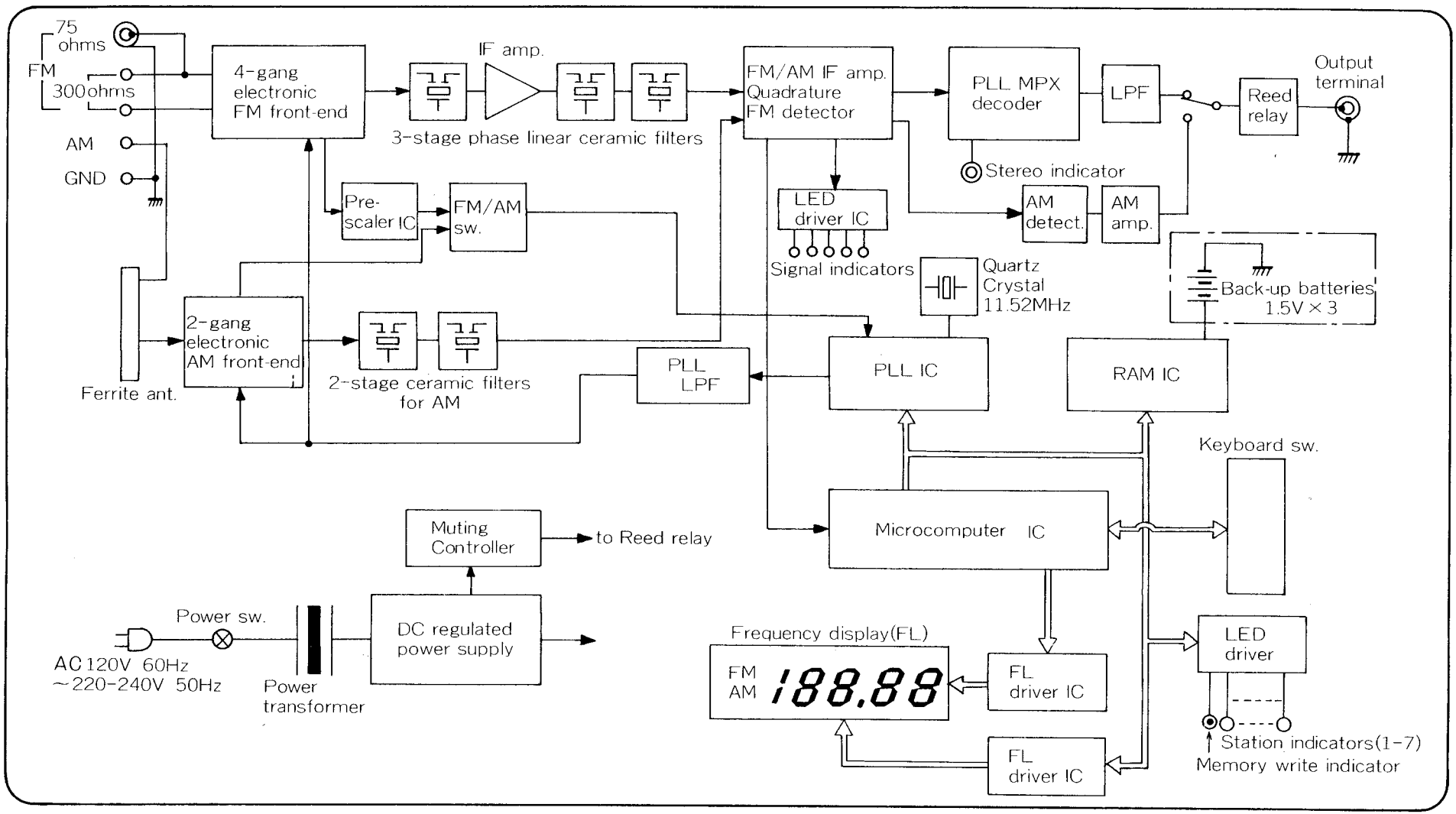
Circuit system	Microcomputer controlled digital synthesizer system MOS FET RF first stage 4-gang electronic tuner front end Quadrature detection, PLL MPX
Frequency band	88.1 to 107.9 MHz (200 kHz steps) for U.S.A. and Canada 87.50 to 108.00 MHz (50 kHz steps) for Europe, Asia and Latin America
Sensitivity	1.0 μV (75 ohms IHF and DIN), 10.8 dBf (new IHF 300 ohms)
Image interference ratio	70 dB (98.1 MHz)
IF interference ratio	90 dB (98.1 MHz IHF) 90 dB (98 MHz DIN)
Total harmonic distortion	MONO: 0.1% (at 1 kHz, IHF and DIN) STEREO: 0.2% (at 1 kHz, IHF and DIN)
Signal-to-noise ratio	MONO: 73 dB (IHF) 68 dB (DIN) STEREO: 68 dB (IHF) 64 dB (DIN)
Frequency response	20 Hz to 15 kHz (75 μs ±1 dB) for U.S.A. and Canada 20 Hz to 15 kHz (50 μs ±1 dB) for Europe, Asia and Latin America
Selectivity	70 dB (±400 kHz IHF) 65 dB (±300 kHz DIN)
Stereo separation	48 dB (1 kHz, IHF and DIN)
Capture ratio	1.0 dB (IHF and DIN)
AM suppression ratio	56 dB (IHF and DIN)
Output voltage	550 mV (400 Hz, 75 kHz deviation)
Antenna terminal	300 ohms balanced and 75 ohms unbalanced

AM TUNER SECTION

Circuit system	Microcomputer-controlled digital synthesizer system first stage 2-gang electronic tuner front end
Frequency range	530 to 1,610 kHz (10 kHz steps) for U.S.A. and Canada 531 to 1,602 kHz (9 kHz steps) for Europe, Asia and Latin America
Sensitivity	20 μV (IHF), 40 μV (DIN) 300 μV/m (IHF bar antenna), 500 μV/m (DIN bar antenna)
Image interference ratio	50 dB (IHF and DIN)
IF interference ratio	34 dB (IHF and DIN)
Selectivity	32 dB (IHF ±10 kHz, DIN ±9 kHz)
Signal-to-noise ratio	50 dB (IHF and DIN)
Output voltage	150 mV (400 Hz, 30% modulation)

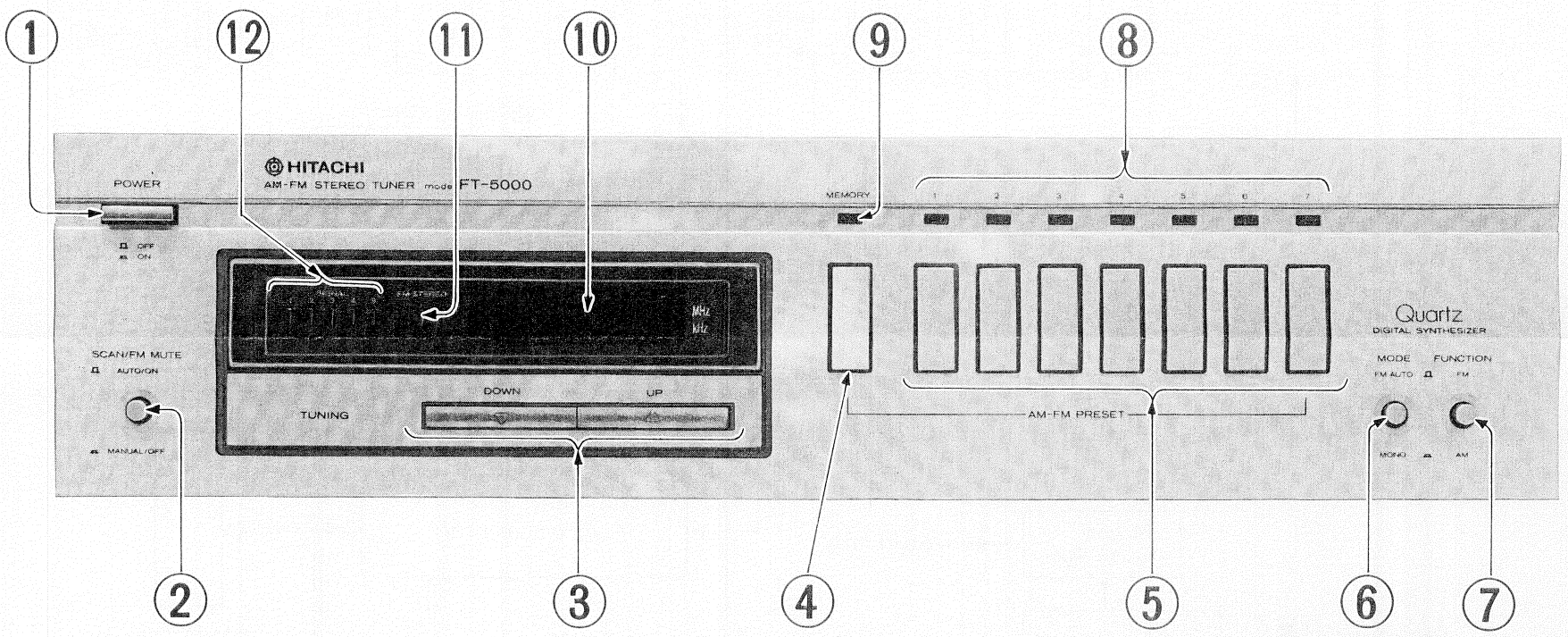
POWER SUPPLY, OTHERS

Power requirements	AC 120 V 60 Hz for U.S.A. and Canada ~110–120 V/220–240 V 50/60 Hz for Asia and Latin America ~220–240 V 50 Hz for Europe, U.K. and Australia
Power consumption	12 watts
Dimensions	435 (W) x 105 (H) x 273 (D) mm (17-1/8" x 4-1/8" x 10-3/4")
Weight	4.4 kg
Semiconductors	9 ICs, 49 transistors (4 FETs), 98 diodes (14 LEDs)
Accessory functions	SCAN/FM MUTE switch, MODE switch, SIGNAL indicator, STEREO indicator, Memory write indicator, Station indicator, MEMORY write key, PRESET keys, TUNING keys, Coaxial cable connector (for U.S.A. and Canada) Auxiliary power outlet (for U.S.A. and Canada), DIN antenna socket (for Europe, Asia and Latin America)
Accessories	FM feeder antenna, Connection cord, 3 dry batteries UM-3(G), 75 ohms FM Antenna adaptor (for U.S.A. and Canada)

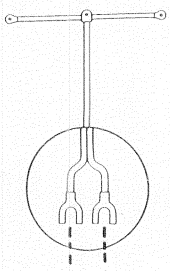

75 ohms
FM
300ohms
AM
GND
4-gang electronic FM front-end
IF amp.
3-stage phase linear ceramic filters
FM/AM IF amp. Quadrature FM detector
PLL MPX decoder
LPF
Reed relay
Output terminal
Stereo indicator
Pre-scaler IC
FM/AM sw.
LED driver IC
Signal indicators
AM detect.
AM amp.
Quartz Crystal 11.52MHz
Back-up batteries 1.5V×3
Ferrite ant.
2-gang electronic AM front-end
2-stage ceramic filters for AM
PLL LPF
PLL IC
RAM IC
Keyboard sw.
Muting Controller
to Reed relay
Microcomputer IC
Power sw.
AC 120V 60Hz
~220-240V 50Hz
Power transformer
DC regulated power supply
Frequency display(FL)
FM
AM
188.88
FL driver IC
FL driver IC
LED driver
Station indicators(1-7)
Memory write indicator

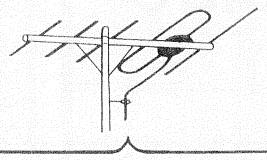
FT-5000

HITACHI



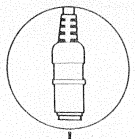
FM feeder antenna
(accessory)
UKW-Dipolantenne
(Zubehör)
Descente d'antenne FM
(accessoire)
T-antenn
(tillbehör)



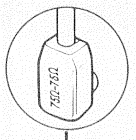


FM OUTDOOR ANTENNA
AUSSENANTENNE
ANTENNE FM EXTERIEURE
UTOMHUS FM-ANTENN

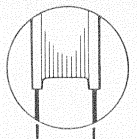
75 ohms coaxial cable (DIN)
75 Ohm Koaxialkabel (DIN)
Câble coaxial 75 ohms (DIN)
75 ohms koaxialkabel med DIN-plugg

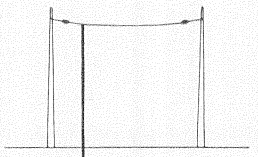


75 ohms coaxial cable
75 Ohm Koaxialkabel
Câble coaxial 75 ohms
75 ohms koaxialkabel



300 ohms feeder
300 Ohm Dipol
Descente 300 ohms
300 ohms bandkabel

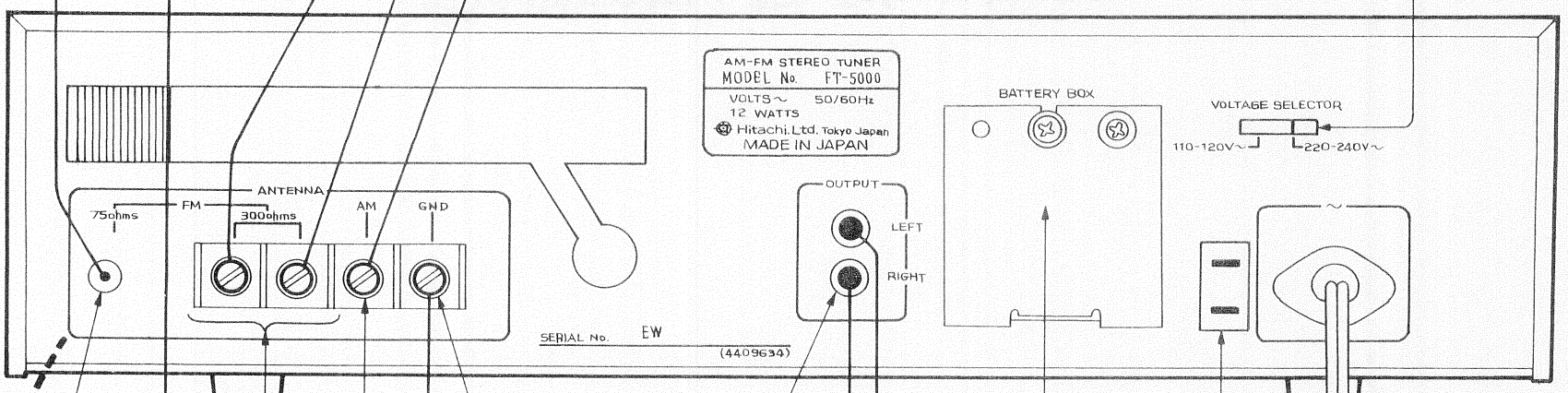




AM ANTENNA
NW-ANTENNE
ANTENNE PO
AM-ANTENN

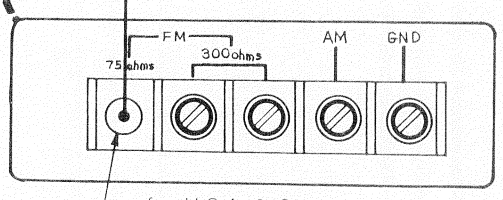
22

for W.Germany, Asia & Latin America



for U.S.A., Canada, Europe, Asia & Latin America

Ground (Earth)
Erdung
Terre
Jord

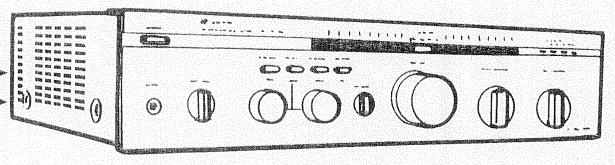


for U.S.A. & Canada

15

Connecting cords
(accessories)
Anschlußkabel (Zubehör)
Cordons de branchement
(accessoires)
Anslutningssladd

R
L
L
R



Amplifier
Verstärker
Amplificateur
Förstärkare

To tuner input terminals
An Tuner-Eingangsklemmen
Vers les bornes d'entrée du tuner
Till tuner-ingång